

DIVISION 3 - CONCRETE

SECTION 03 52 16.13
LIGHTWEIGHT CELLULAR INSULATING CONCRETE

A. GENERAL

RELATED WORK SPECIFIED ELSEWHERE

Modified Bitumen Roofing System	Section 07 52 00
Membrane Roofing System (TPO)	Section 07 54 23
Roof Accessories	Section 07 72 00

DESCRIPTION OF WORK

Furnish the administration, facilities, materials, labor, equipment, and quality control (QC) necessary to integrate the work into the total building system so that leakage into the building does not occur. The lightweight cellular insulating concrete (LCIC) system is an assembly of components including the insulation and lightweight concrete materials necessary to complete the assembly.

DESCRIPTION OF SYSTEM

Lightweight cellular insulating concrete (LCIC) system shall be one of the following (or approved equal), providing that the materials meet the requirements under Part B, Products below:

Elastizell Composite Insulating Roof Deck System; Elastizell Corporation of America
NVS Roof Insulating System; Siplast, Inc.

QUALITY ASSURANCE

Applicators shall be factory trained and qualified personnel, licensed by the LCIC manufacturer. Applicators shall be craftsmen trained, knowledgeable and experienced in the actual application of this specified LCIC system.

LCIC subcontractor shall be a firm with a minimum of five years experience in the application of the type of LCIC system shown and specified. All LCIC system work and associated work shall be subcontracted to a single firm which shall have undivided responsibility for the specified performance of component parts as follows (even though some components may be subcontracted to others):

Roof insulation
Lightweight concrete material

The LCIC installer shall maintain a full-time supervisor/foreman on the jobsite during times that LCIC work and associated work is in progress. Supervisor must have a minimum of five years experience in LCIC work similar to the nature and scope of the specified LCIC system.

INSURANCE AND CODE REQUIREMENTS

Manufacturer and installer shall coordinate to provide assemblies which comply with the following:

Underwriters Laboratories requirements for "Class A" non-combustible roof.
FM Global Class NC-60-A requirements.

WARRANTY

Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Government with the LCIC system manufacturer's 10 year labor and materials warranty. The warranty shall include the composite LCIC system consisting of concrete material and roof insulation panels. All repair or replacement costs covered under the warranty shall be borne by the LCIC system manufacturer. The warranty shall be a term type, without deductibles or limitations on coverage amount, and be issued at no additional cost to the Government. Specific items covered during the term of the LCIC system warranty shall include:

1. The actual resistance to heat flow through the roof insulation will be at least 80% of the design thermal resistance, provided that the roofing membrane is free of leaks.
2. The LCIC system will remain in a reroofable condition should the roof membrane require replacement (excluding damage caused by fastener pullout during removal of the old membrane).
3. The roof insulation material will not cause structural damage to the building as a result of expansion from thermal or chemical action.

PRE-INSTALLATION CONFERENCE

Prior to the installation of LCIC system and associated work as listed above and after approval of required Shop Drawings as specified below, the General Contractor shall arrange a Pre-Installation Conference at the project site at a pre-arranged time approved by the Government Construction Representative. The conference shall include in attendance the General Contractor, the LCIC subcontractor and his jobsite foreman, installers of related work (including installers of wood blocking, roofing, flashing and sheet metal), representatives of the LCIC manufacturer, and the Government Construction Representative. The General Contractor shall record any discussions or agreements that are made which are not specifically addressed in the Contract Documents and shall furnish a copy to all involved participants.

The discussions of the conference and decisions, agreements and/or disagreements shall be recorded with a written copy of the meeting minutes sent to each party attending. This conference shall review foreseeable methods and procedures related to the LCIC system work, including but not necessarily limited to the following:

1. Tour representative areas of roof deck, inspect and discuss conditions of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
2. Review structural loading limitations of roof deck.
3. Review LCIC system requirements, drawings, specifications and other contractual documents.
4. Review required submittals, both completed and yet to be completed.
5. Review complete material list of all items proposed to be furnished and installed under this Section.
6. Review manufacturer's recommended methods of installation for insulation and concrete materials.
7. Review any addenda.
8. Review and finalize construction schedule related to LCIC system work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
9. Review forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary roofing procedures.

SUBMITTALS

Shop Drawings shall be submitted in accordance with Section 1B, Shop Drawings/Submittals. Shop Drawings shall include a roof plan showing roof slopes and insulation thickness, and shall show in detail the anticipated method for the placement and application of the LCIC system and associated materials, including insulation.

Before the start of work on-site, submit four copies of:

- (1) Latest edition of LCIC system manufacturer's published general requirements, technical literature, repair instructions, and material safety data sheets for each system to be used in this Contract.
- (2) Latest editions of all other material manufacturer's product and installation literature.

During installation, perform sampling and testing as described in paragraph below titled "Sampling and Testing".

PRODUCT DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered in their original, unopened containers or protective coverings clearly labeled with manufacturer's name, name brand, and appropriate identification numbers. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier. Adhesives shall be stored between 40 deg. F and 80 deg. F. Materials damaged in handling or storage shall not be used and shall immediately be removed from the site.

Store all materials to prevent them from becoming wet, soiled, or covered with ice or snow before, during, or after delivery to site. Store material in a completely enclosed building or trailer, if possible. If necessary to store outdoors,

stack materials on platforms or pallets at least 4 inches above ground and cover with waterproof canvas. Allow air circulation under canvas so condensation does not occur; do not extend canvas to ground. Remove nonweathertight plastic manufacturer-supplied packaging from insulation prior to storage; tear off labels and tuck in insulation stack for identification purposes.

Do not store large bundles of LCIC system materials at one location on the roof. The Contractor shall assume full responsibility for the structural integrity of the roof during his roofing operations.

All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

JOB CONDITIONS

Proceed with application of LCIC system and associated work only when existing and forecast weather conditions and temperature meet the recommendations of the LCIC system manufacturer.

Protect other work from spillage of LCIC system materials and prevent all materials from entering or clogging drains or connecting piping. Replace or restore other work which has been soiled or otherwise damaged by application of LCIC system.

Proceed with application of LCIC system only after substrate construction and installation of perimeter blocking nailers, vents, piping and drains have been completed.

Install LCIC system only if materials, equipment, and tradesmen required for the immediate installation of the LCIC system are at the project site. Do not install more insulation than can be covered with lightweight concrete materials by the end of that working day.

Protect completed work where damage may be caused by other trades working on the roof.

Upon completion of the installation, an inspection shall be conducted by a technical representative of the LCIC system manufacturer to ensure compliance with current specifications and details.

B. PRODUCTS

LIGHTWEIGHT CELLULAR INSULATING CONCRETE (LCIC) SYSTEM

Lightweight cellular insulating concrete shall be a slurry of cement, water, and preformed foam to produce an insulating concrete of a specific density range. Foam concentrate shall comply with ASTM C869 when tested in accordance with ASTM C796.

Portland cement shall comply with ASTM C150, Type I, II or III.

Water shall be potable and shall be clean and free of deleterious amounts of acid, alkali and organic materials.

Physical properties of concrete materials shall meet the following criteria:

Cast density: 35-45 lbs./cubic feet

Minimum compressive strength: 250 psi

Roof insulation shall be minimum 1.0 pcf expanded polystyrene insulation board conforming to ASTM C578 Type I, in thickness shown on the Drawings. Roof insulation shall have bond holes equal to approximately 3% of the board area.

MIXING

Mix in strict accordance with manufacturer's written instructions. Provide batch-type mechanical mixer with a suitable charging hopper, water storage tank, and a water-measuring device. Use only mixers which are capable of mixing aggregates, cement and water into a uniform mix within specified time, and of discharging mix without segregation. Mix each batch of concrete material 2 cubic yards or less for at least 1 1/2 minutes after ingredients

are in mixer. Increase mixing time 15 seconds for each additional cubic yard or fraction thereof.

C. EXECUTION

CONDITION OF SURFACES

Remove dirt, loose material, oil, grease, paint or other contaminants from concrete roof deck, leaving a clean surface. When base slab surface is smooth and unacceptable for good bonding, roughen surface by chipping or scarifying before cleaning. The installation of the LCIC system shall be an indication of the Contractor's acceptance of the substrates, and he will automatically assume the responsibility for any unacceptable finished work caused by substrate conditions.

Clear deck of all standing water, dirt, debris, ice, etc.

Prepare the roof grades prior to placing the LCIC system.

MIXING AND PLACEMENT

Concrete materials shall be mixed in approved equipment according to manufacturer's published instructions and shall be pumped into place.

Install the LCIC system in strict accordance with manufacturer's published installation requirements to insure proper drainage, the required insulation value, and the published fire and uplift ratings.

LCIC system shall be placed when temperatures are 32 degrees F and rising. If colder temperatures are anticipated, the Installer shall take suitable precautions (heated water, etc.) for the installation of an acceptable LCIC system. Coordinate the roofing membrane application with the LCIC system installation to avoid prolonged exposure of the LCIC system deck.

Pour minimum ¼" thick bond coat followed by roof insulation, then topped with a minimum 1" of concrete material. Roof insulation may be stair-stepped or of constant thickness.

Screed material to the proper thickness and slope. The surface shall be free of ridges and sharp projections prior to installation of the roofing membrane.

SAMPLING AND TESTING

Check the cast density at the point of placement and adjust the mix to obtain the required cast density. A minimum 4 specimens (3" x 6" cylinders) shall be sampled at the point of placement daily or for each 100 cubic yards of material placed. Protect samples from damage and temperature extremes and test according to ASTM C796. Compressive test samples shall not be oven-dried prior to testing. Report test samples shall not be oven-dried prior to testing. Report test results to the Government Construction Representative.

PROTECTION

Protect the LCIC system from construction traffic. Roofing membrane installation may commence 2 to 3 days after LCIC system installation is complete. This facilitates curing and reduces drying shrinkage. The LCIC system should not be left exposed for longer than 5 to 7 days.

PATCHING

Perform all patching and repairing of concrete material using materials approved by the LCIC system manufacturer.